

Information Technology *for Engineering & Manufacturing*

Deploying Advanced PDM Capabilities at Ford Motor Company

This presentation discusses the Ford Motor Company CAD/CAM/CAE/PIM (C3P) initiative as it is deployed to provide advanced Product Data Management (PDM) capabilities for new product development. This multi-year development and deployment initiative is taking advantage of new PDM capabilities to help define, improve and integrate diverse product development tools into a cohesive and effective environment for vehicle design, analysis, manufacturing and support. The presentation also addresses recent PDM activities conducted by the Automotive Industry Action Group (AIAG) pertaining to requirements for PDM data exchange in global development collaboration.

Presented by Rick Bshara

Rick Bsharah is a Senior Technical Specialist at Ford Motor Company in the Product Information Management (PIM) Systems department. He is responsible for providing technical direction in the development and use of logical as well as physical information architectures and models to support CAD/CAM/CAE/PIM and enterprise integration. He is also Ford's representative to the Automotive Industry Action Group's (AIAG) Vehicle Product Data Team, the U.S. Technical Advisory Group (TAG) of the International Standards Organization's (ISO) Technical Committee 184/SC4, and the Product Data Exchange using STEP (PDES Inc.) industry cooperative. He has over 15 years of experience in engineering and advanced information management within the aerospace and automotive industries.

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Deploying Advanced PDM Capabilities at Ford Motor Company



June 12-13, 2000

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Ford Motor Company

Purpose

- ***Discuss PDM strategy, capability and impact in Ford Motor Company***
- Review AIAG identified requirements for PDM data exchange in global development collaboration
- Summarize with results and key lessons learned from the on-going Ford PDM implementation

Ford is Implementing PDM Functionality through the C3P Initiative

Computer-Aided Design

Computer-Aided Manufacturing

Computer-Aided Engineering

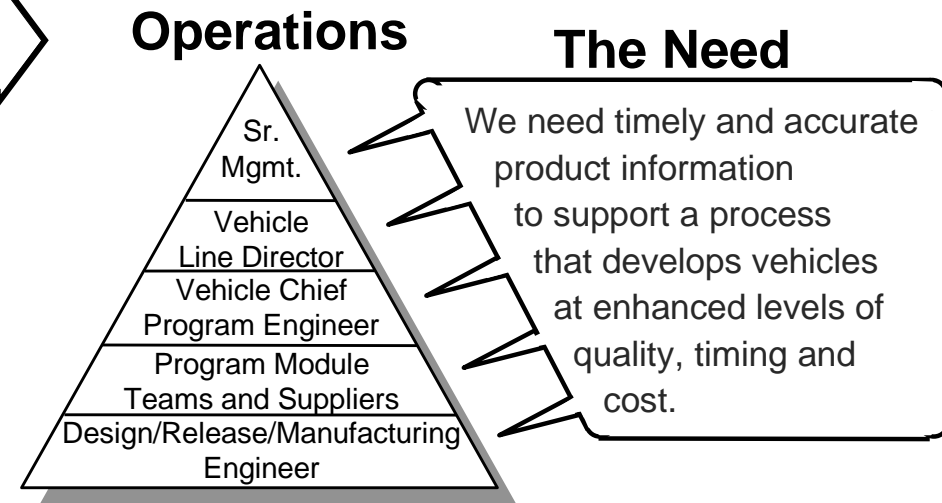
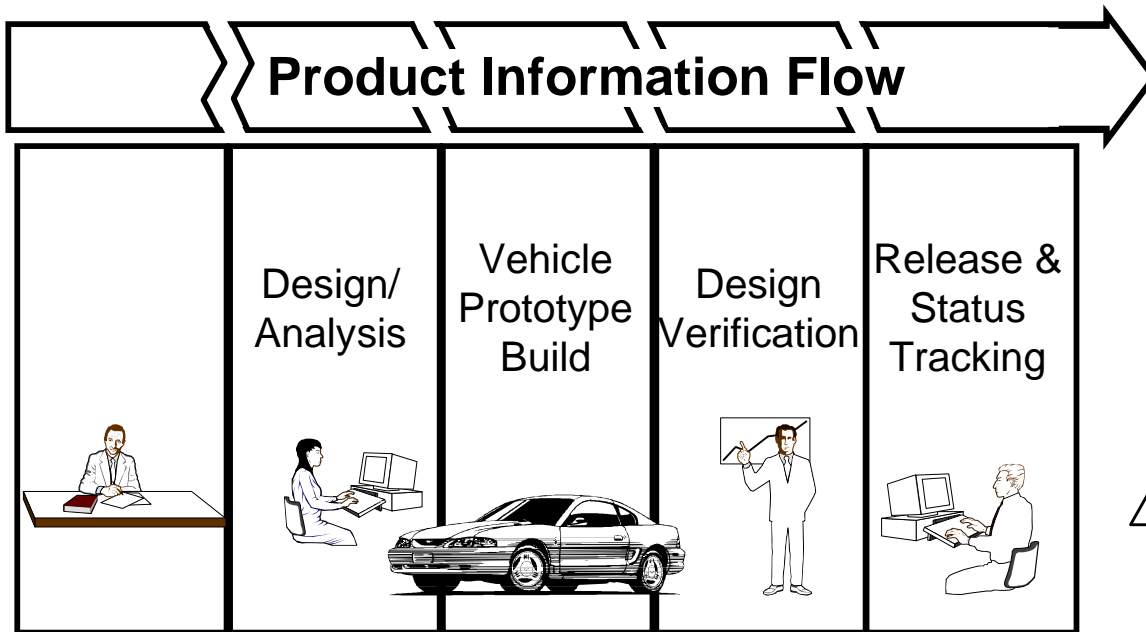
Product Information Management
(PIM is the C3P Initiative terminology for PDM)

*C3P is an integrated set of tools that is being used to support
and fully optimize the Ford Product Development process*

Key C3P Strategies

- **Provide a single, high-tech “language” across all of Ford Motor Company**
- **Emphasize PIM – global access to current engineering and manufacturing information**
- **Facilitate execution of interrelated, multi-disciplinary tasks in a simultaneous manner**
- **Establish the platform for a complete vehicle Analytical Prototype**
- **Build foundation for full electronic definition from product concept to manufacturing**

PIM is Challenged to Meet the Needs of the Process Driven Environment



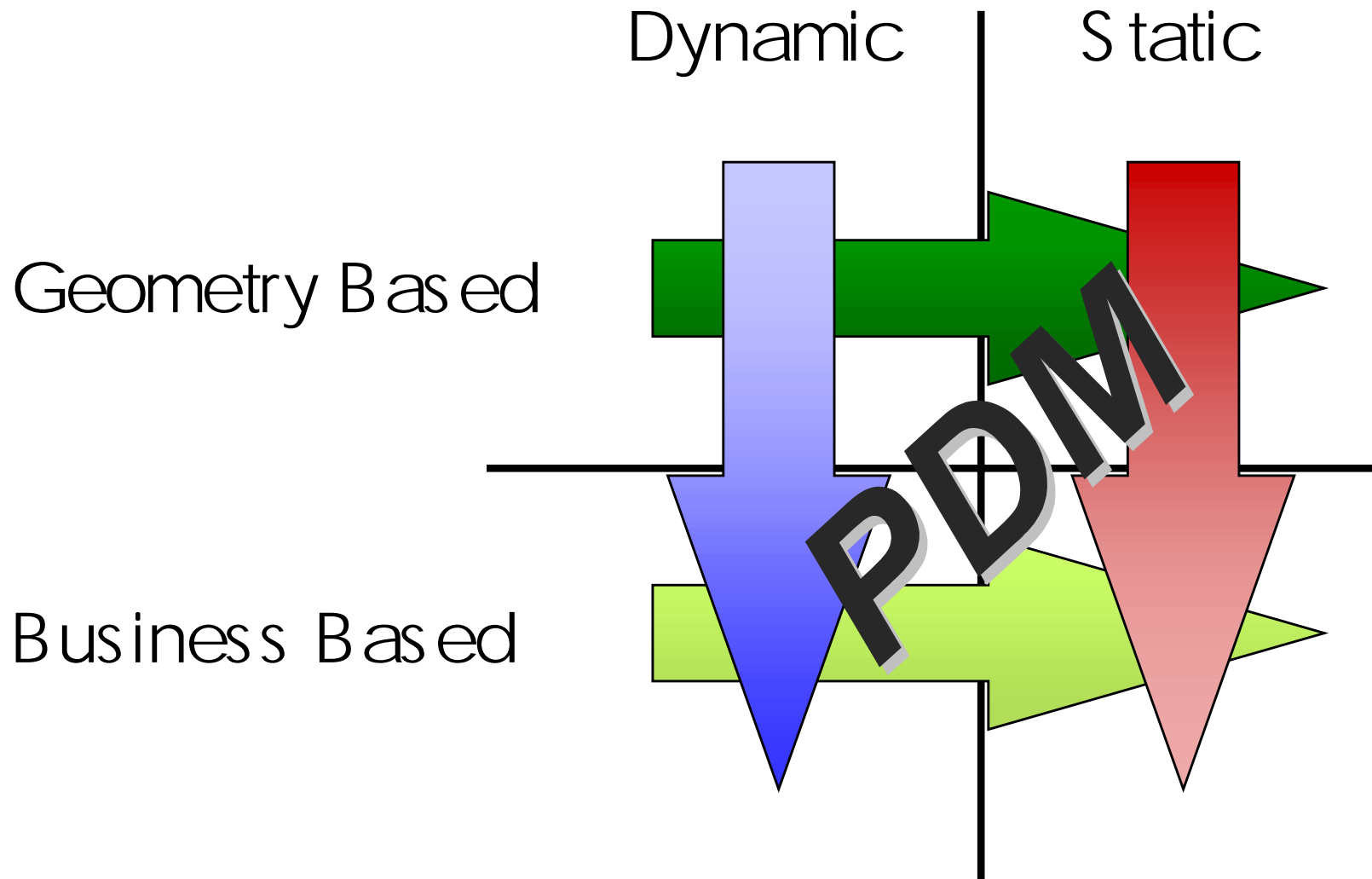
The Challenge

How do we provide effective product information within the present environment of processes and systems that were designed for organizational and functional views instead of a process view?

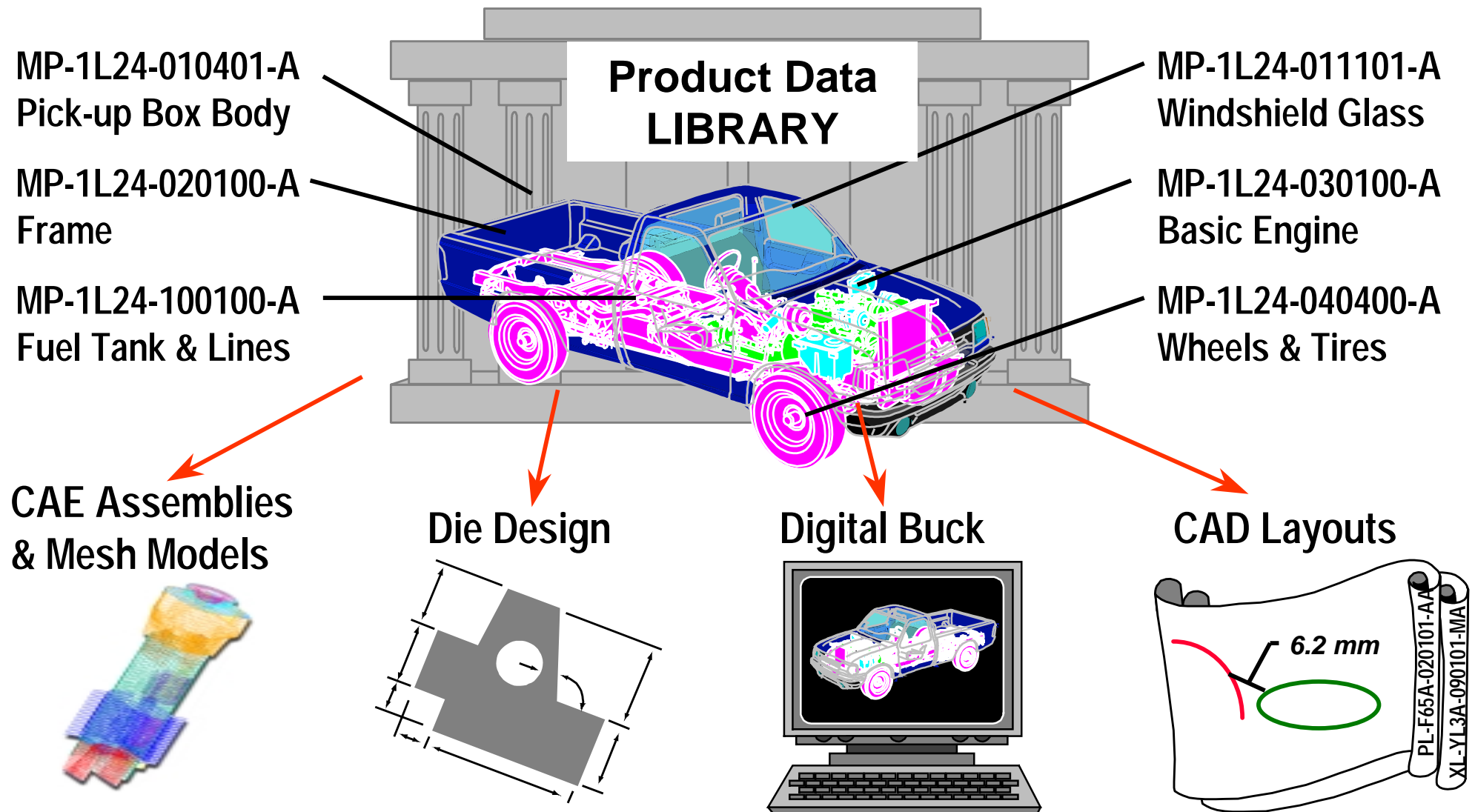
Organization & Supporting Systems Environment

- Company run by function and geography
- Systems built for specific functional requirements in geographic areas
- Process-based information views are difficult to obtain

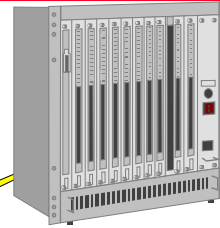
Complex Data Dynamics and Data Type Issues are Inherent to PDM Environment



PIM Yields a Master Package of CAD Geometry in Vehicle Position

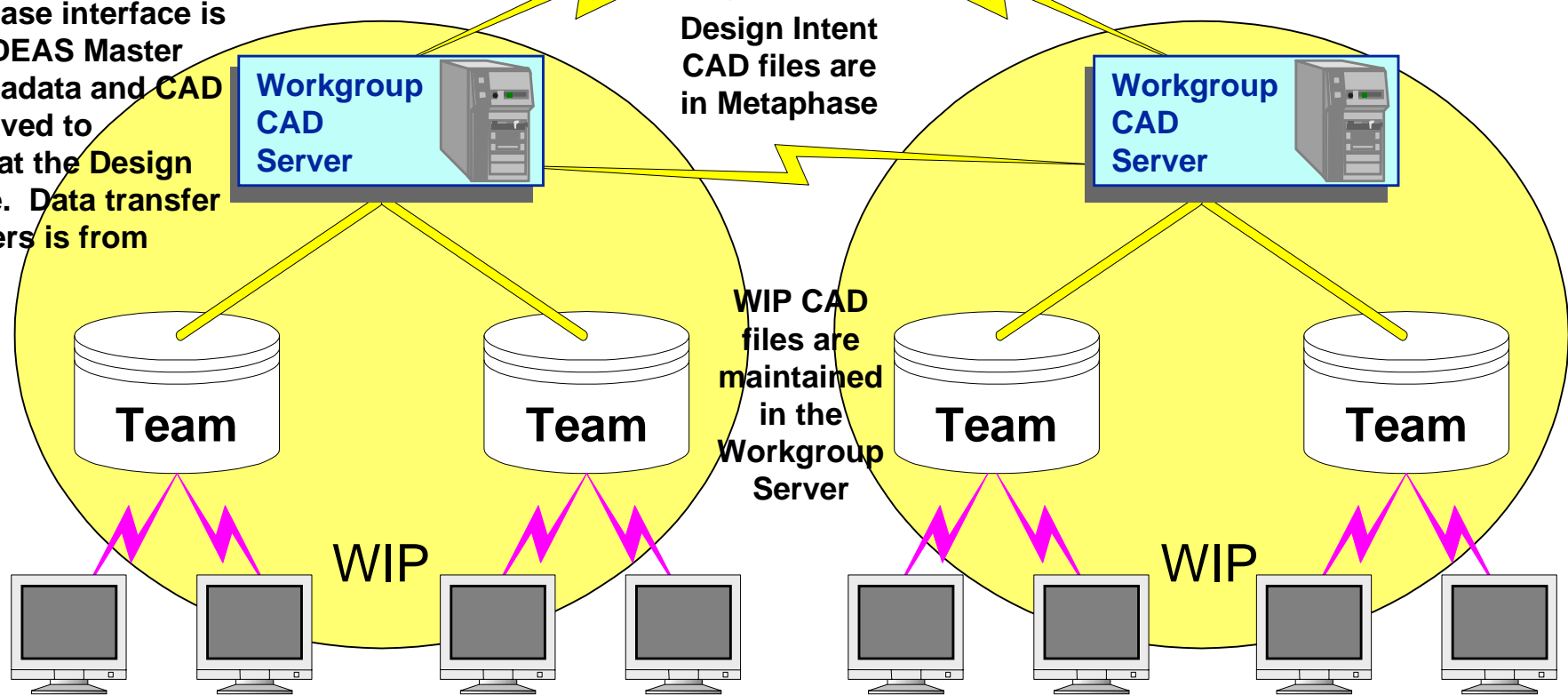


Ford C3P Implements Robust PDM Architecture and Toolset

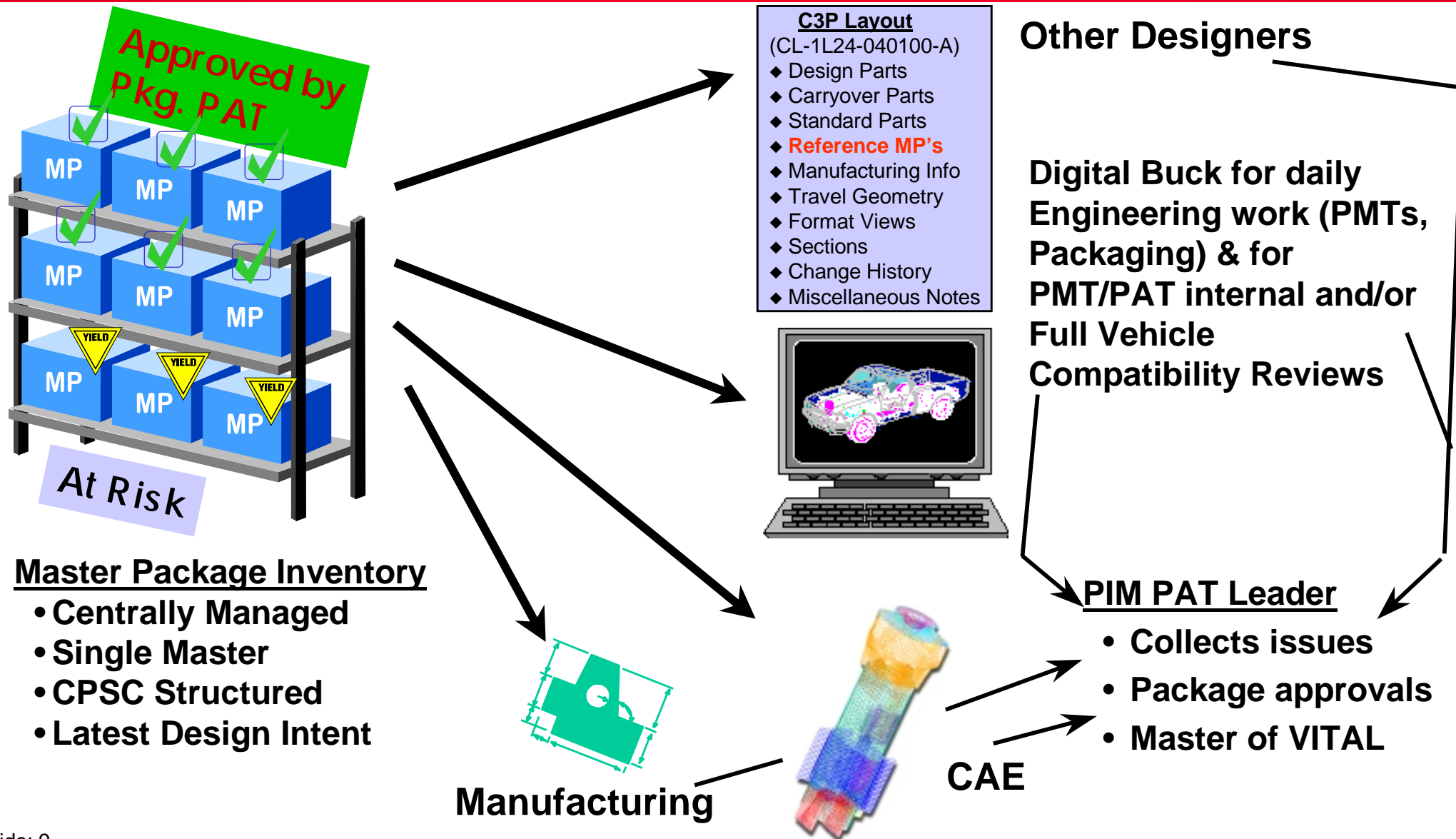


Metaphase has the master directory of all geometry for a specified vehicle program

The Metaphase interface is built into I-DEAS Master Series. Metadata and CAD files are moved to Metaphase at the Design Intent stage. Data transfer to other users is from Metaphase.

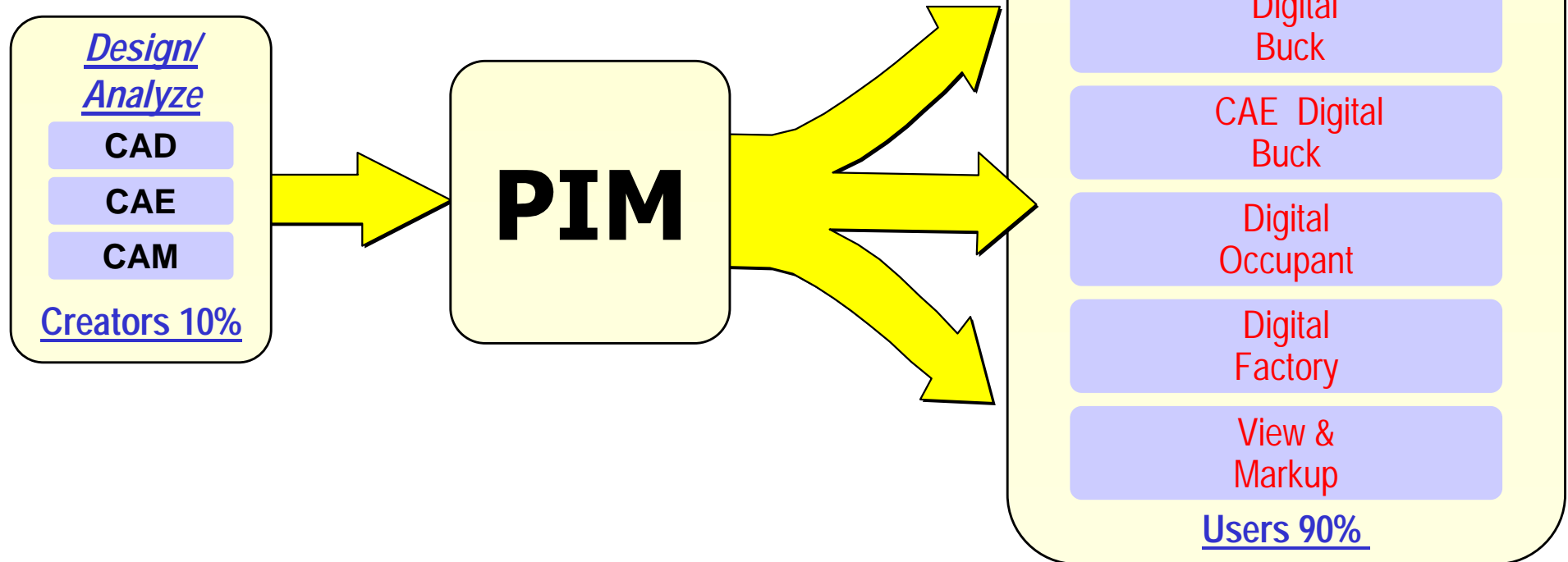


Customers Utilize PIM Contents in Different Ways ...

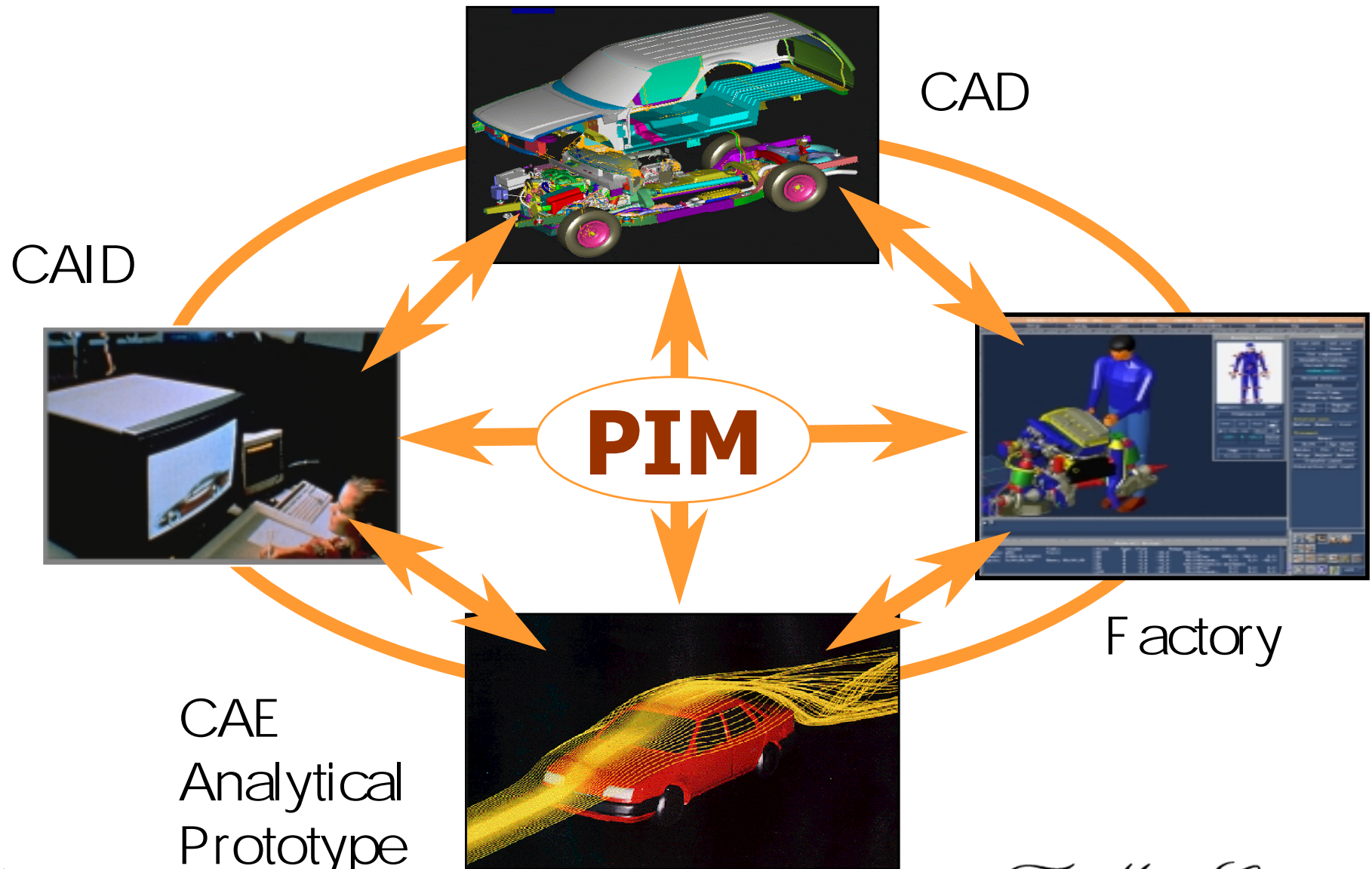


Key PIM Use is to Enable Advanced Visual Engineering Capabilities

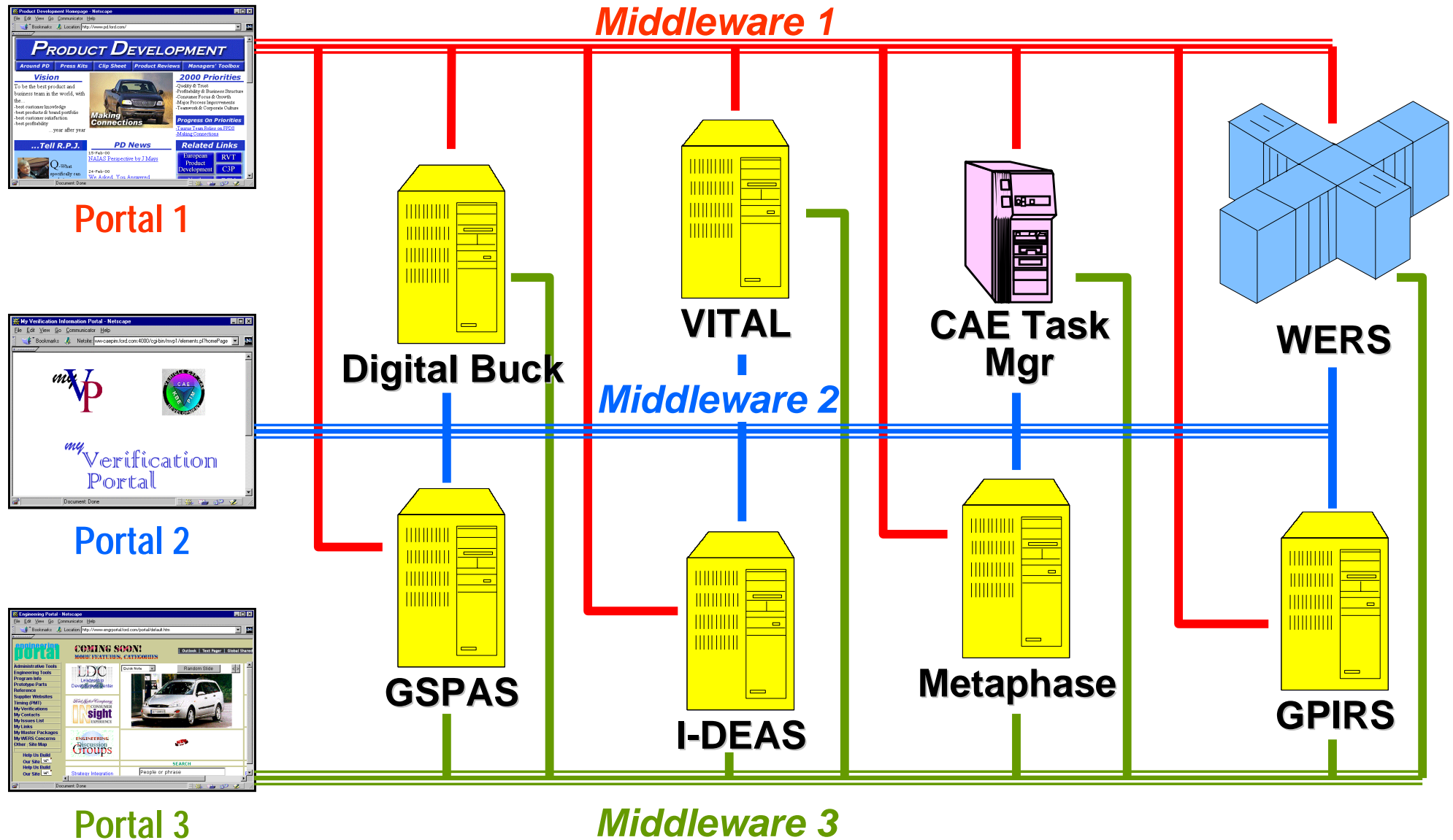
Visual Engineering simplifies review, analysis, evaluation and communication of complex product and manufacturing data while allowing process integration for data like CAE results, kinematics/dynamics, attributes and issues.



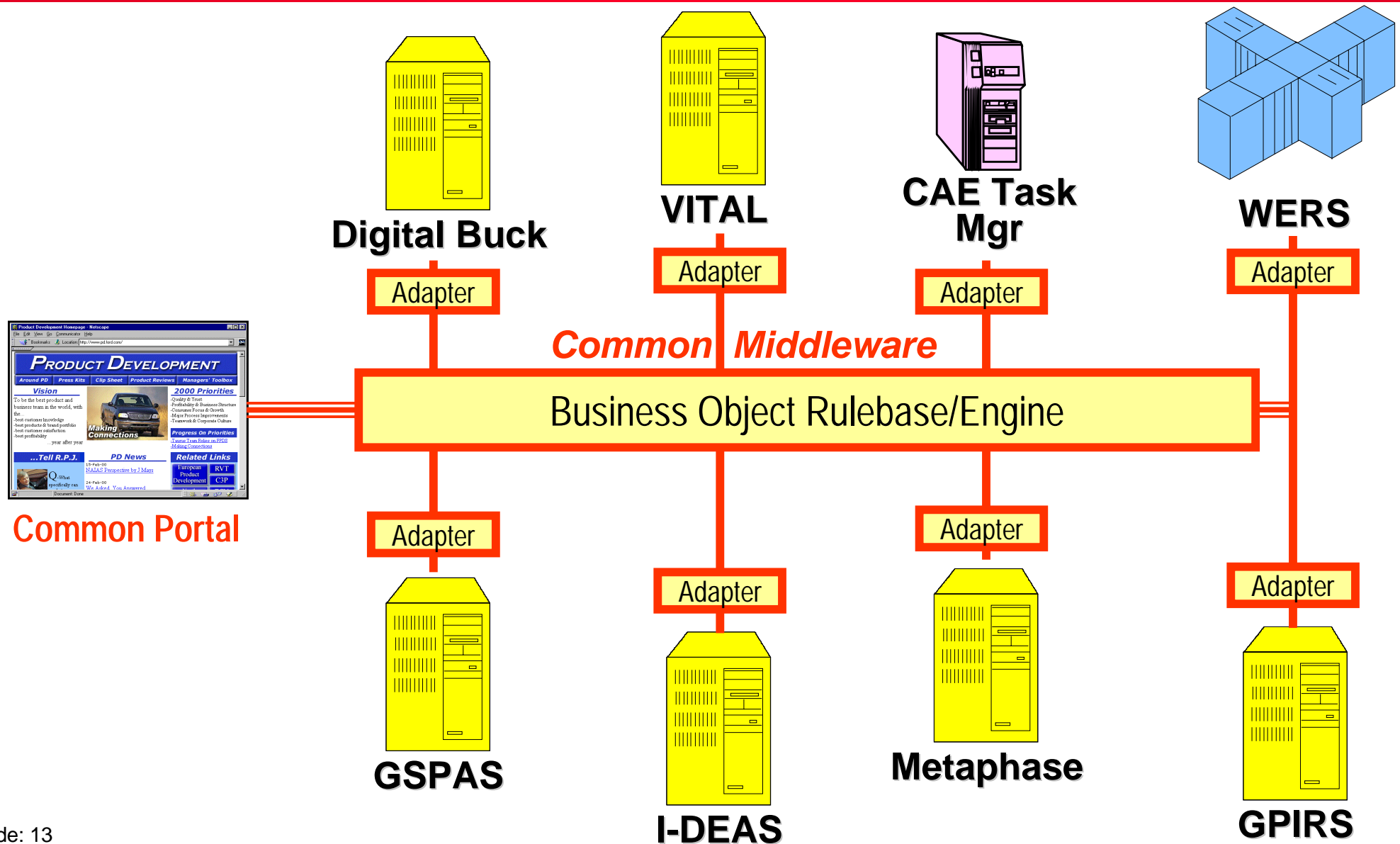
Ford's Visual Environment Revolves Around PIM Data Resources



Today PDM Functions are in Many Systems Accessed with Multiple Portals



Build-To State Uses Rules to Access PDM Data in Systems through a Single Portal



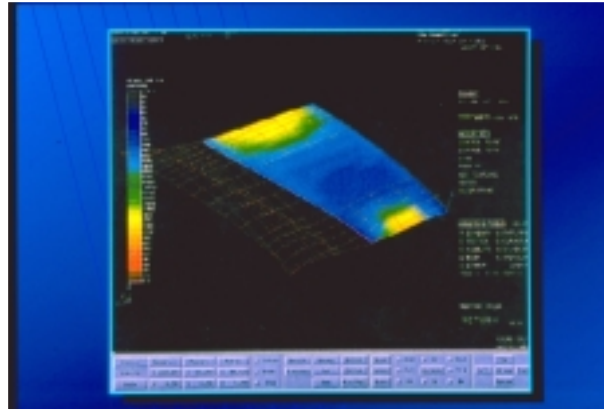
Purpose

- Discuss PDM strategy, capability and impact in Ford Motor Company
- ***Review AIAG identified requirements for PDM data exchange in global development collaboration***
 - **Note: Data Based on AIAG Product Data Management Information Exchange Workgroup interim results.**
- Summarize with results and key lessons learned from the on-going Ford PDM implementation

PIM Yesterday and Today



Early Design

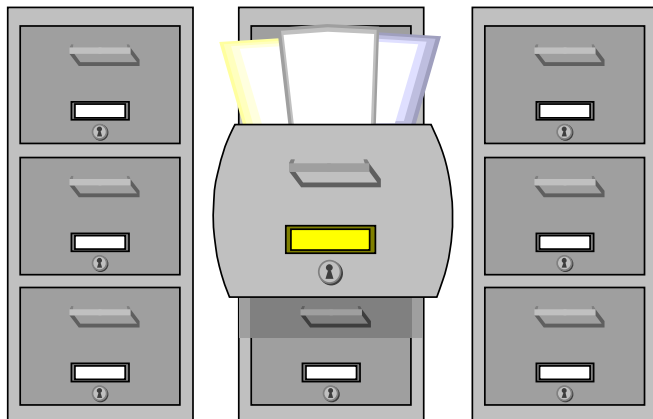


PDGS



I-DEAS

File Room



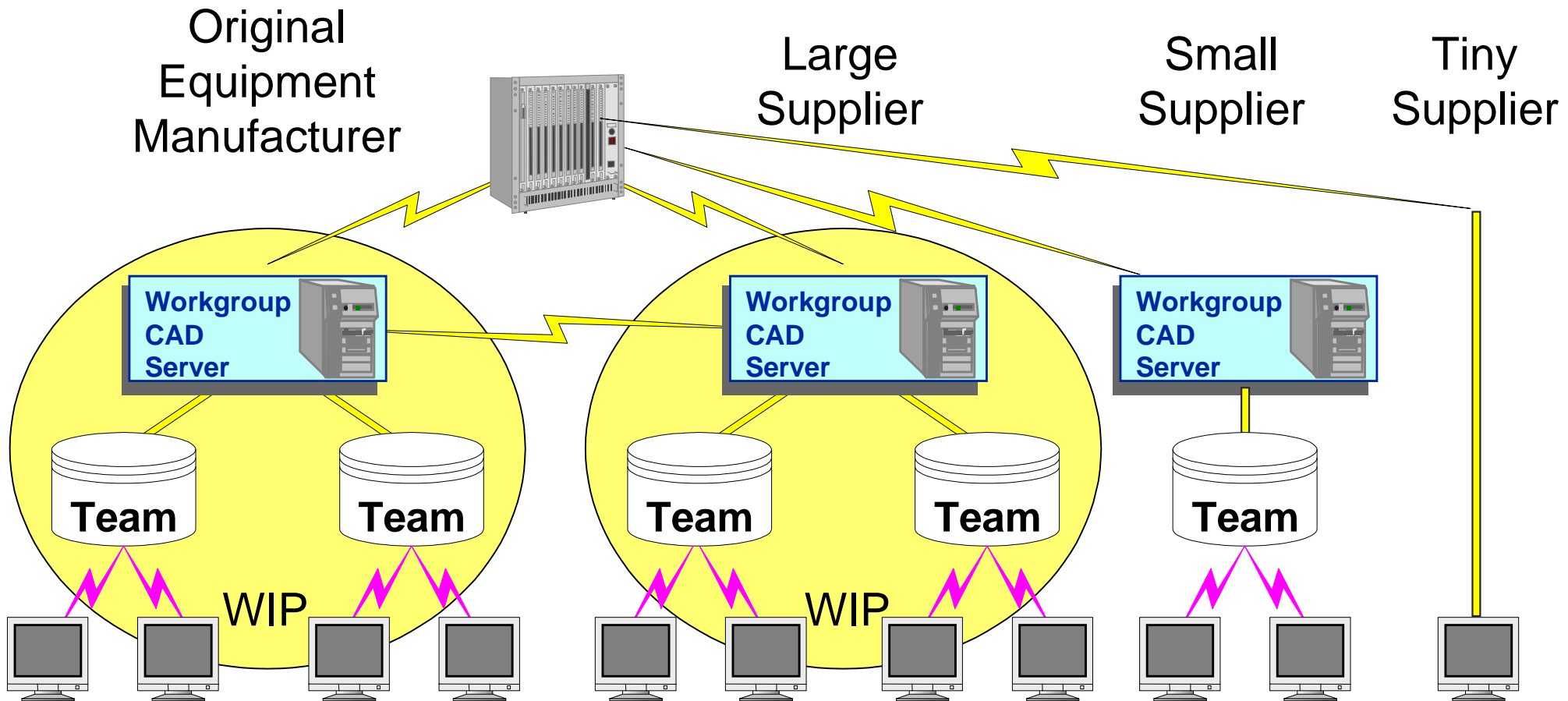
Data Collector



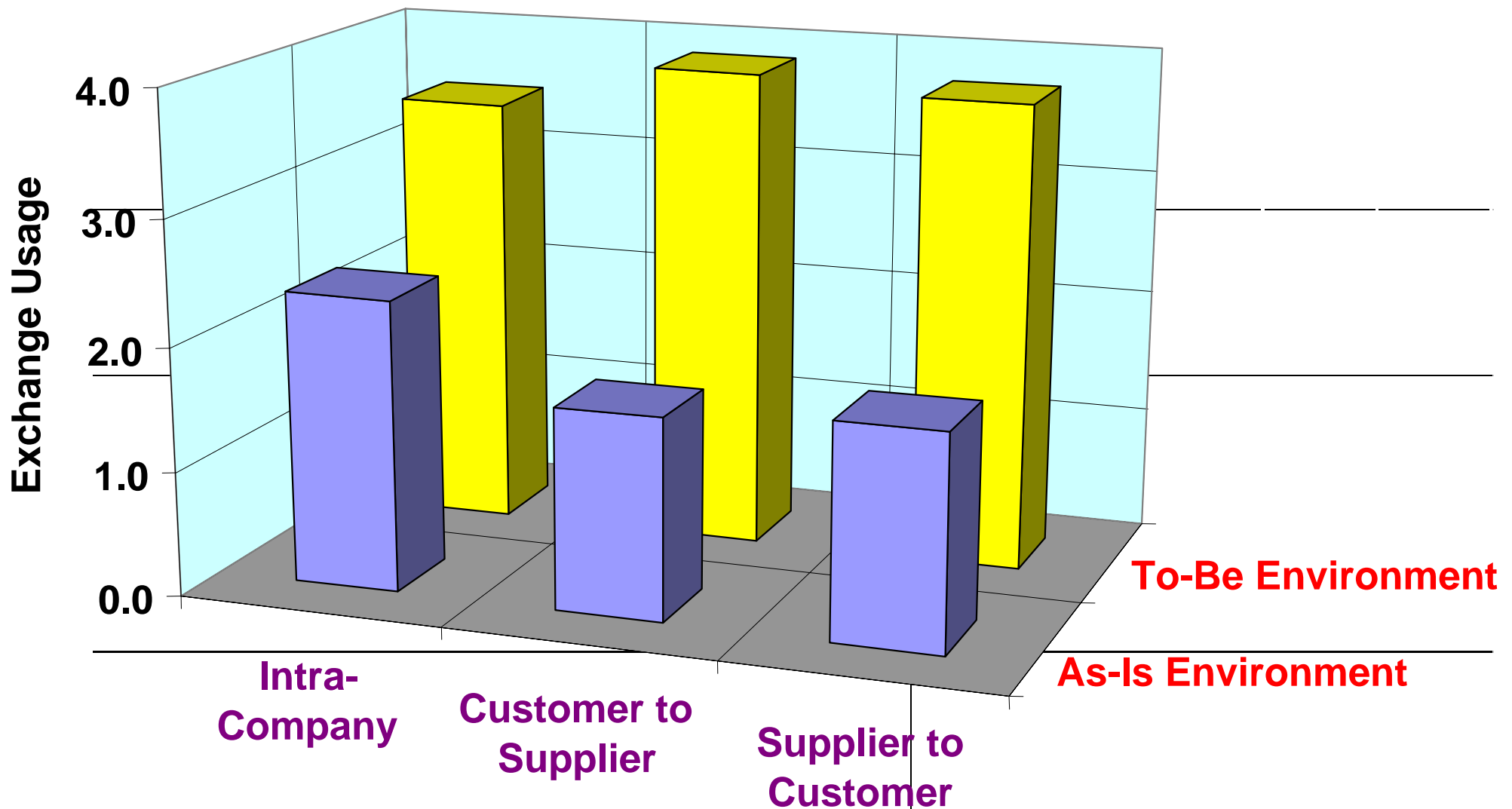
Metaphase,
WE RS , etc.



PDM is Needed to Facilitate Product Development in the Extended Enterprise



Key PDM Data Exchange Usage is Increasing to Meet Global Needs



PDM Data Exchange Usage is Relatively Low in Today's Enterprises

AS-IS Scenario Matrix	Exchange of Product Meta Data Only					Exchange of Product Meta Data with CAx Bulk Data				
	Commodity Design	Black Box Design	Gray Box Design	Collaborative Design	Customer Design	Commodity Design	Black Box Design	Gray Box Design	Collaborative Design	Customer Design
Company W/G PDM to/from W/G PDM	0.44	0.44	0.22	0.22	0.56	1.22	0.89	0.56	0.78	1.22
Company Entr. PDM to W/G PDM	0.78	0.56	0.56	0.67	0.78	1.33	0.89	0.89	1.00	1.22
Company W/G PDM to Entr. PDM	0.44	0.56	0.56	0.78	0.78	1.00	0.78	1.00	1.11	1.22
Customer Entr. PDM to Supplier Entr. PDM	0.56	0.89	0.89	1.11	1.44	0.44	1.00	1.00	1.33	1.22
Customer Entr. PDM to Supplier W/G PDM	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.11
Customer W/G PDM to Supplier Entr. PDM	0.00	0.00	0.00	0.00	0.22	0.00	0.22	0.22	0.44	0.67
Customer W/G PDM to Supplier W/G PDM	0.33	0.00	0.00	0.00	0.33	0.33	0.67	0.33	0.44	1.00
Supplier Entr. PDM to Customer Entr. PDM	1.11	0.78	0.78	1.22	1.22	0.67	1.44	1.44	1.67	1.67
Supplier Entr. PDM to Customer W/G PDM	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.11	0.11
Supplier W/G PDM to Customer Entr. PDM	0.00	0.11	0.11	0.33	0.33	0.00	0.33	0.33	0.56	0.33
Supplier W/G PDM to Customer W/G PDM	0.22	0.00	0.00	0.00	0.00	0.33	0.67	0.33	0.33	0.56
Enterprise (Entr.) PDM: Refers to an environment where the data is accessible by all members of the enterprise. (e.g., multiple teams/projects)										
Workgroup (W/G) PDM: Refers to environment where data is only accessible by members of the workgroup; i.e., a set of individuals focusing on a particular matter.										
LEGEND:	High Usage =	2.0		Medium Usage =	1.0		Low Usage =	0.0		

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Ford Motor Company

PDM Data Exchange Usage is Increasing to Meet Global Business Needs

TO-BE Scenario Matrix	Exchange of Product Meta Data Only					Exchange of Product Meta Data with CAx Bulk Data				
	Commodity Design	Black Box Design	Gray Box Design	Collaborative Design	Customer Design	Commodity Design	Black Box Design	Gray Box Design	Collaborative Design	Customer Design
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Company W/G PDM to Entr. PDM	0.78	1.11	1.22	1.67	1.44	1.00	1.33	1.44	1.67	1.56
Customer Entr. PDM to Supplier Entr. PDM	1.00	1.67	1.89	2.33	2.22	0.78	1.78	1.78	2.67	2.56
Customer Entr. PDM to Supplier W/G PDM	0.22	0.44	0.44	0.67	0.89	0.44	0.78	1.00	1.00	0.89
Customer W/G PDM to Supplier Entr. PDM	0.44	0.67	0.67	0.78	0.56	0.44	0.67	0.67	0.78	0.89
Customer W/G PDM to Supplier W/G PDM	0.44	0.44	0.44	0.78	0.56	0.44	0.89	0.89	0.89	0.89
Supplier Entr. PDM to Customer Entr. PDM	1.44	1.67	1.78	2.22	1.67	1.11	1.89	2.00	2.44	2.22
Supplier Entr. PDM to Customer W/G PDM	0.22	0.22	0.33	0.67	0.56	0.33	0.56	0.67	1.00	0.67
Supplier W/G PDM to Customer Entr. PDM	0.56	0.56	0.56	0.89	0.44	0.67	0.89	1.00	0.89	0.44
Supplier W/G PDM to Customer W/G PDM	0.56	0.56	0.67	0.78	0.44	0.67	0.89	1.00	0.89	0.56
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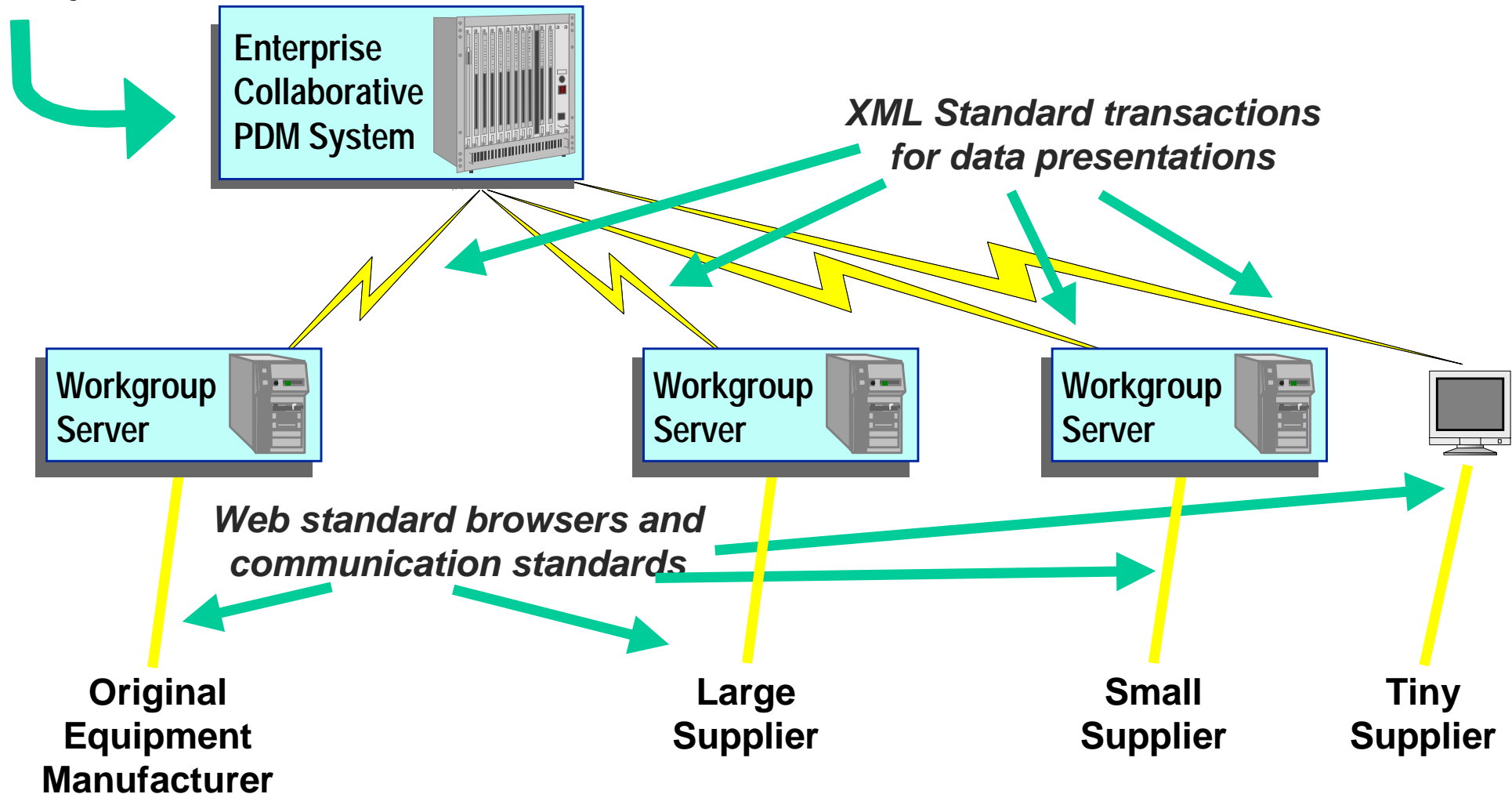
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Ford Motor Company

PDM Collaboration Architecture Leverages Standards

*ISO STEP Standards for
data object definitions*

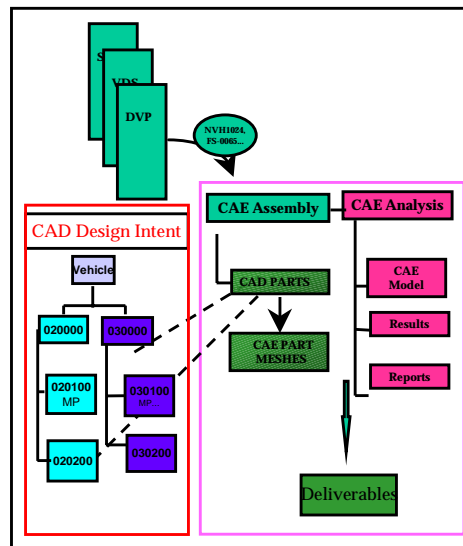
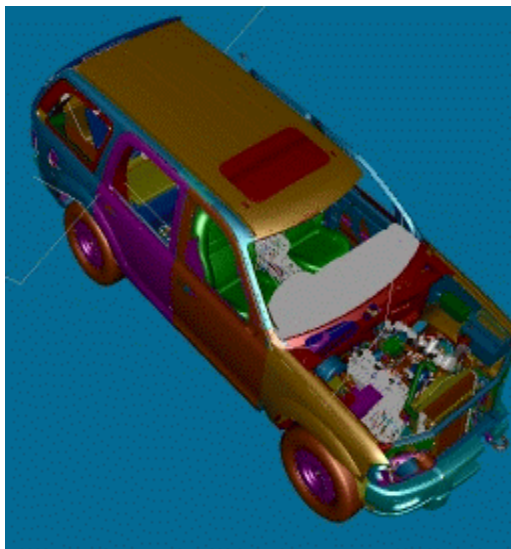


Purpose

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- ***Summarize with results and key lessons learned from the on-going Ford PDM implementation***

Ford is Successfully Transitioning PDM Tools for Product Development

- Created Ford Automotive Operations PIM Organization
- Deployed PIM Tools & Process to Vehicle Programs
- Worldwide Availability of Single Source Vehicle Program Based CAD Information
- Digital Buck Breakthrough Cultural Transformation
- Foundational Catalog Pilot (ADP - Catalyst)

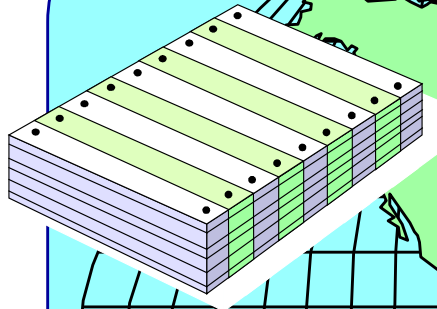


Lessons Learned . . .

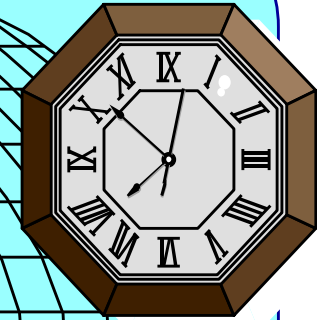
- **Must allocate and identify resources to support PDM processes (skilled data/process people are key!)**
- **Require adherence to PDM procedures and compliance with PDM standards (challenge to work with partners!)**
- **Need buy-in to vehicle development PDM process by ALL participants to share product data**
 - do not use principle: wait - hide - (bad) surprise
 - do use principle: share - compare - repair (early enough)
- **Efficient PDM processes and Data Management with suppliers is a challenge**

The Five Rights of PDM for the Global Enterprise

RIGHT Information



RIGHT Time



RIGHT Format



RIGHT Location



RIGHT People



Cover Information per NIST Request for PDM

Session Speaker -

Rick Bsharah

Presentation Title: Deploying Advanced PDM Capabilities at Ford Motor Company

Name: Fredrick Bsharah

Title: Senior Technical Specialist

Affiliation: Ford Motor Company - PIM Systems Department

Current Position: Mr. Bsharah is a Senior Technical Specialist at Ford Motor Company in the Product Information Management (PIM) Systems department. He is responsible for providing technical direction in the development and use of logical as well as physical information architectures and models to support CAD/CAM/CAE/PIM and enterprise integration. He is also Ford's representative to the Automotive Industry Action Group's (AIAG) Vehicle Product Data Team, the U.S. Technical Advisory Group (TAG) of the International Standards Organization's (ISO) Technical Committee 184/SC4, and the Product Data Exchange using STEP (PDES Inc.) industry cooperative. He has over 15 years of experience in engineering and advanced information management within the aerospace and automotive industries.

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